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AUTHOR Kent, Thomas L.
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ABSTRACT

Writers and writing teachers should be wary of depending on readability indexes as indicators of the difficulty of written messages. The Gunning Fog Index and the Damerst Clear Index, two readability formulas, were used to determine the readability of "A Statement of Editorial Policy" and two abstracts appearing in an issue of "PMLA." Although the passages varied widely in their readability scores, all three were considered equally readable to the intended audience. It was concluded that both the Gunning and the Damerst indexes measured readability instead of comprehensibility. Another way to view this problem is to associate "audience level" with "audience expectation." The more knowledge possessed about a particular kind of message, the less uncertain the message will be, and the greater will be the audience's comprehension of the message. Neither the Gunning Fog nor the Damerst Clear Indexes accounted for this elementary relation. Teachers can help students by studying the technical aspects of student work and by talking with experts in different technical areas to realize what readability means to different audiences. Students certainly should learn that clarity is important and that different audiences require different kinds of communication; but they should also learn that clarity cannot be quantified by counts and measures. (RL)

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READABILITY AND AUDIENCE RESPONSE: UNFOGGING THE FOG INDEXES

Thomas L. Kent
Department of English
Iowa State University
Ames, Iowa 50011

A commonplace in the teaching of composition is the observation that readability--the correspondence between writing style and audience level--affects the clarity of information transfer, but only in the teaching of technical writing does there seem to be a programmatic effort to show the student how he may tailor his writing style to fit a particular audience level. Readability is so important in technical writing because technical reports, perhaps more than any other kind of formal composition, appeal specifically to limited and well-defined audiences. To communicate clearly his findings, the technical writing student must find his audience and meet its demands. In the prewriting stage the student generally has little difficulty identifying his intended audience, for he knows what he intends to do and how he intends to do it. During the composing stage when he actually writes the report, the student frequently forgets about his audience after once identifying it in the prewriting stage. It is during the revising or editing stage that most students are forced to wrestle with the readability problem, and many students are instructed to revise their writing to meet what the instructor perceives to be the demands of the students' audiences. In an attempt to make technical language more readable, writing instructors tell their students that simplicity is best, and to drive home their lesson, instructors suggest that students employ a measuring system like the Gunning Fog Index or the Damerst Clear Index in order to determine the complexity level of their writing.

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Although revision serves a necessary and good purpose, the unfortunate truth is that the criteria instructors employ to make judgements about readability are often arbitrary and specious, especially the so-called "readability indexes." In the following discussion I shall describe some of the difficulties involved with employing the Gunning Fog Index and the Dale-Chall Index as measuring systems to determine the audience level or readability of a particular piece of writing, and I shall make some tentative suggestions about alternatives to readability indexes.

The Gunning Fog Index is perhaps the best known of all the readability formulas. In his approach Gunning attempts to derive the school-grade level at which a particular writing sample may be comprehended. To determine the appropriate school-grade level, the following steps must be followed: [1]

1. Count off in a sample of your writing to the period closest to 100 words. Divide the total number of words in this passage by the number of sentences, which you must count, of course.

2. Going back over the same passage, count the words having three syllables or more, except
   (a) words that are capitalized (proper nouns).
   (b) words that are combinations of short easy words (like "bookkeeper" and "butterfly").
   (c) verb forms that are made three syllables by the addition of -ed or -es (like "created" or "trespasses").

3. Add the numbers representing the average number of words per sentence, and the number of words having three syllables or more. Then, to determine the Fog Index, multiply the sum of these two by .4.

Written as an equation, the formula is

.4[ASL (average sentence length)+PS (percentage of polysyllabic words]=Fog Index

The school-grade reading level and the appropriate Fog Index value for each are indicated in the following chart. To give the chart more meaning, Gunning shows a magazine having the same Fog index:

	Fog Index	Reading Level by Grade	Reading Level by Magazine
	17	College graduate	
	16	" senior	(No popular magazine
	15	" junior	this difficult)
	14	" sophomore	
Danger Line	13	" freshman	
	12	High-school senior	Atlantic Monthly
	11	" junior	Harper's
	10	" sophomore	Time
	9	" freshman	Reader's Digest
	8	Eighth grade	Ladies Home Journal
	7	Seventh "	True Confessions
	6	Sixth "	Comics

The Damerst Clear Index is much the same as Gunning's Index except that Damerst's final numerical value corresponds to a grade on a one-hundred point scale; the higher the grade the better. Damerst's Clear Index works like this:

1. Count off about 100 words, stopping at the period (or the semicolon or the colon separating main clauses) that is closest to 100. Record the exact number of words, counting everything that is not an actual word (for example, $25) as one word.

2. If the number is higher or lower than 100, adjust it to 100 by changing the number of words above or below 100 to a percentage. (Example: the total to the closest period is 115; therefore, change the 15 over 100 to 15%.) Then apply the percentage to the total. Although precision is important later--in steps 4 and 5--it is not essential here. (Thus in our example we can obtain 100 approximtely by subtracting 15.)

3. Reread the same piece of writing; as you read, count the number of words having only one syllable (sound). Count contracted words (like "we'd") as single words. Record the number. (In our example let's say we find 67 words having one sound.)

4. Adjust the number of one-sound words by using the same percentage that was applied in step 2. (Example: the number found in step 3 was 67. Thus the adjusted number of one-syllable words is approximately 57 (67-15%, or 10; 67 - 10 = 57.)

5. In the scale below, on the "Number of One-Syllable Words" line, locate the number found in step 4. Directly below the number you will find the "Clear Word-Value." If the number of one-syllable words lies between two numbers on the top line, add or subtract 2.5 to the "Clear-Word Value." This

number should be recorded in a separate place. (In our example the "Clear Word-Value" is 25.)

The Clear Index Word-Value Scale

Number of One-Syllable Words	47	49	51	53	57	59	61	65	67 or more
Clear Word Value	0	5	10	15	25	30	35	45	50

6. Find the average number of words per sentence by dividing the number of sentences into the number found in step 1. Remember to count main clauses as sentences if they are separated by a semicolon or a colon. On your work sheet, record this number; do not adjust it. (In our example let's say that we find six sentences. The average number of words per sentence, then, is approximately 19 (115 - 6 = approximately 19). You may be exact if you wish, but in most cases the approximate number is close enough.

7. In the scale following, on the "Average Number of Words per Sentence" line, locate the number found in step 6. Directly below the number you will find the "Clear Sentence-Value." Add this value to the value found in step 5. The sum is the Clear Index. (In our example, the Clear Sentence-Value is 40. The Clear Index of the writing in the example, therefore, is 65 (25 + 40 = 65).)

The Clear Index Sentence-Value Scale

Average Number of Words per Sentence	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	10	9	8	7
Clear Sentence Value	0	5	10	15	20	25	30	35	40	45	50	50	50	50	45	45	40	35	25	10	0

As an example of how these indexes operate, consider the following well known sample from "A Statement of Editorial Policy" in a current issue of PMLA.

> PMLA publishes articles on the modern languages and literatures that are of significant interest to the entire membership of the

> Association. Articles should therefore normally: (1) employ a widely applicable approach or methodology; or (2) use an inter-disciplinary approach of importance to the interpretation of literature; or (3) treat a broad subject or theme; or (4) treat a major author or work; or (5) discuss a minor author or work in such a way as to bring insight to a major author, work, genre, or critical method. Articles of fewer than 2,500 or more than 12,500 words are not normally considered for publication.

The Gunning Fog Index:

Number of words in passage	98
Number of sentences	3
Average number of words per sentence	33
Polysyllabic words	17

ASL + PS = 50
x .4
Fog Index 20

On the Gunning scale the sample would rate a "20" which indicates that the passage is beyond the readability level of even college graduates. To be more accurate, though, this sample may be seen to have more than three sentences, at least five main clauses. This change in number reduces the final result to about "12" which places PMLA on the same level as the Atlantic Monthly.

The Damerst Clear Index:

Number of words in passage	103
Single syllable words	60
Percentage adjustment -2	58
Word-Value Index	27.5
Average number of words per sentence	13
Sentence-Value Index	45

Clear Word-Value (27.5)+ Clear Sentence Value (45) = 72.5

On the Damerst scale the sample earns about a "C-."

Several problems are apparent at once with these measurements, but perhaps the most serious difficulty concerns what the measurements really measure. Damerst tells us that readability indexes serve as "a check on writing to see if there is too much fog or too little clarity," and they "indicate how much

difficulty your reader will probably have in decoding your message." [2] But is it always true that word and sentence length combine to form clear writing? Consider the following examples taken from abstracts in the January, 1980, PMLA:

> My field consists of those works of diary or epistolary fiction in which the author has limited the narrative voice to one diarist or letter writer. The strategy allows the author to focus on a drama of self-perception involving two main participants: the diarist and the text. The outcome of the drama basically depends on how the diarists write and how they read what they write. In the first part of my essay, I treat the drama of successful self-discovery through representative works by Tennyson, Mauriac, Bernanos, Sartre, and Gide. In the second part, I treat Werther, Lermontov's Pechorin, and Mariane of the Lettres portugaises as writers who use their literary mode in essentially the opposite way: to maintain an existing idea of themselves.

According to the Gunning Fog Index, this passage should be clear to a high-school senior, and the Damerst scale awards the passage about an "A-." The following passage, however, taken from the same issue of PMLA, would be beyond the readability level of a college graduate, according to Gunning's index, and it would receive a mark of "F" on the Damerst scale.

> The theater-dream metaphor raises fundamental ontological and epistemological questions and treats them in much the same way as phenomenological thought does. Both the metaphor and Edmund Husserl's theory "reduce" the ontological problem to a play of experience--to activity and process--leaving the final question of what is "real" unresolved. Such activity necessarily involves Heideggerean "dimensions" that are not only open, mobile, temporal, "in play" but also structural, patterning. Examples ranging from Renaissance to modern drama, from the Russian to the American stage, show how dimensions are revealed both as the familiar structures of our thinking (stratifications, circles within circles, temporal delineations, subject-object categories, etc.) and as the structuring principles by which "real" and "imagined" worlds establish relationships.

To a MLA audience I suspect that these two passages would be about equally readable or clear, and I suspect, too, that the average high-school senior would find the first passage no more readable than the second. The difficulty

here is clear; in both the Gunning and Damerst indexes, readability is not a measure of comprehensibility. What an audience finds readable may bear no relation at all to readability indexes.

Another way to view this problem is to see the concept "audience level" corresponding to the concept "audience expectation." From information theory we know that a transfer of information depends in large part on the expectations held by the person receiving the information. In The Mathematical Theory of Communication Claude Shannon and Warren Weaver explain that,

> Information....is a measure of one's freedom of choice in selecting a message. The greater this freedom of choice, and hence the greater the information, the greater is the uncertainty that the message actually selected is some particular one. Thus greater uncertainty, greater information go hand in hand. [3]

Imagine, for example, that you are told by a reliable weatherman that it will snow on July 4th in Miami Beach. Because you do not expect such an occurrence, or stated another, because you know that the probability of snow on July 4th in Miami Beach is very low, the information content of this message would be very high. And, of course, the inverse of this formulation is consistent as well; if I am told that it will not snow on July 4th in Miami Beach, the information content is low. What this common-sense notion illustrates is that comprehensibility is related directly to our knowledge about a specific message. The more knowledge we possess about a particular kind of message, the less uncertain the message will be, and the greater will be our comprehension of it. Both the Gunning Fog and the Damerst Clear Indexes do not account for this elementary relation. For instance, the probability would be very high that an audience at CCCC would comprehend without difficulty terms like infinitive, coordinating conjunction, restrictive clause, and appositive; the length of the word would have no bearing on comprehension. A group of high school students

probably would have a more difficult experience trying to comprehend the terms while a group of high-school dropouts probably would have a more difficult experience yet.

When we hear that readability indexes "indicate how much difficulty your reader will probably have in decoding your message," we should be wary. Codes change as expectations and information levels of audiences change. But, of course, the technical writing instructor cannot know every code, every expectation of every expert audience. He therefore must rely, I believe, on his training, his instincts, and the expertise of others. By working closely with his students, an instructor can learn enough about the technical aspects of his students' work to enable him to give sound advice about clairty and readability, and by talking with experts in his students' different areas of study, an instructor may begin to learn what readability means to different audiences. A student certainly should learn that clarity is important and that different audiences require different kinds of communication, but he should learn too that clarity cannot be quantified by counts and measures. It seems to me that one method an instructor can employ to demonstrate to his students that clarity is important is to show them that he is willing to go beyond formulas, to seek readability in people, not numbers.

Notes

[1]From William A. Damerst, Clear Teachnical Reports (New York: Harcourt Brace Jovanovich, 1972), pp. 60-62. See also Robert Gunning, The Technique of Clear Writing (New York: McGraw-Hill Book Company, 1968), pp. 38-40.

[2]Damerst, p. 63

[3]Claude E. Shannon and Warren Weaver, The Mathematical Theory of Communication (Urbana: The University of Illinois Press, 1949), pp. 108-109.